



'SCIENCE WITHOUT SCIENTISTS': DIY BIOLOGY AND INSTITUTIONAL LEAKAGE

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Introduction

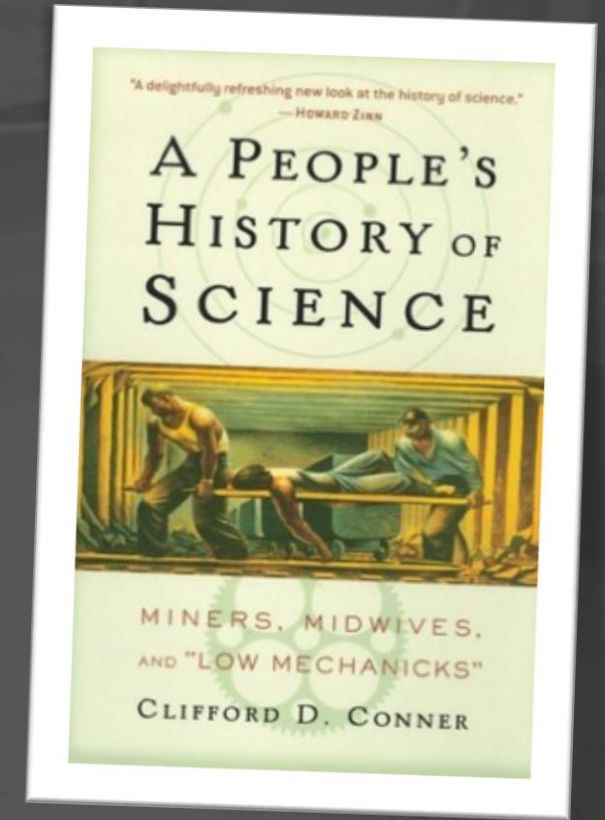
- ▶ Why does DIYbio show up?
- ▶ The multiple histories of DIYbio
 - ▶ DIYbio and hackerspaces
 - ▶ DIYbio and biotech industry
 - ▶ DIYbio and synthetic biology
- ▶ The future of DIYbio

How to understand DIYbio?

- ▶ Four general tendencies
 - ▶ Research
 - ▶ Technology
 - ▶ Fun
 - ▶ Education and critique
- ▶ Next step in science democratisation? (e.g. Meyer, 2012)
- ▶ Problem: not amateurs, but academics

Multiple histories of citizen science

1. The revival of an old tradition
2. Revealing an old tradition
3. New tradition for a new era



Possible history #1 Hackerspaces

- ▶ Steven Levy (1984): the 'hacker ethic' (1960s-1970s)
- ▶ Hackerspaces (1990s) and fablabs (2000s)
- ▶ Counterculture of the 1960s
 - ▶ Cf. Counter Culture Labs (Oakland, USA)



Possible history #1 DIYbio as anti-institutional?

LET'S
MAKE
SCIENCE
GREAT
AGAIN!



“Remember when science was fun? At Genspace it still is.”

Possible history #2 biotech industry

- ▶ Parallels with computers in Silicon Valley

- ▶ From academic to commercial biotech?

“ In the era of Open Source biology, the magic of genes will be available to anyone with the skill and imagination to use it. The way will be open for biotechnology to move into the mainstream of economic development ”

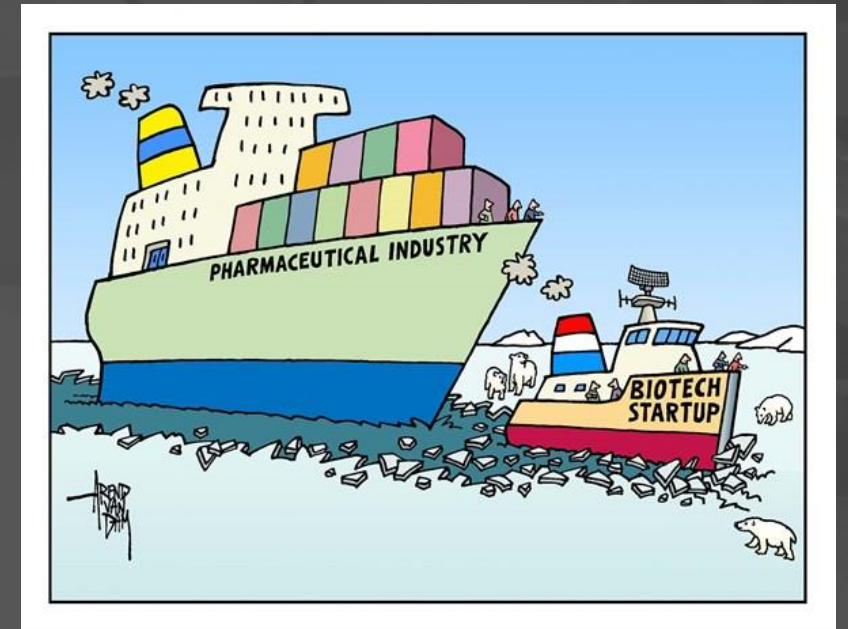
~ Freeman Dyson, Our Biotech Future

- ▶ Freedom as ‘free market’?



Possible history #2 biotech industry

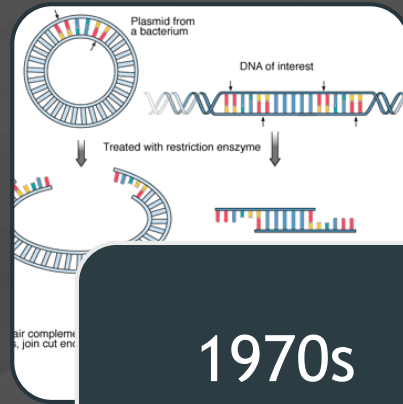
- ▶ Biologists becoming 'indie scientists'
 - ▶ IndieBio, Experiment.com , ...
- ▶ Becoming precarious or even free labour for industry?
- ▶ Don't universities have advantages too?



Possible history #3 history of biology



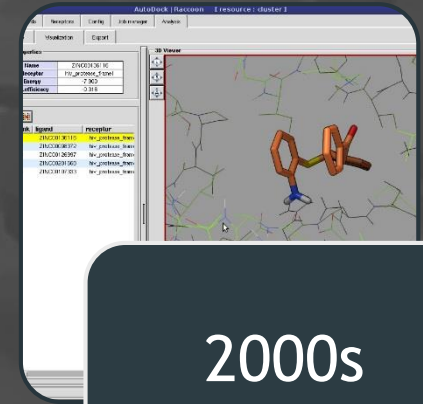
1960s
Molecular
biology



1970s
Genetic
engineering



1990s
Genomics



2000s
In silico
biology

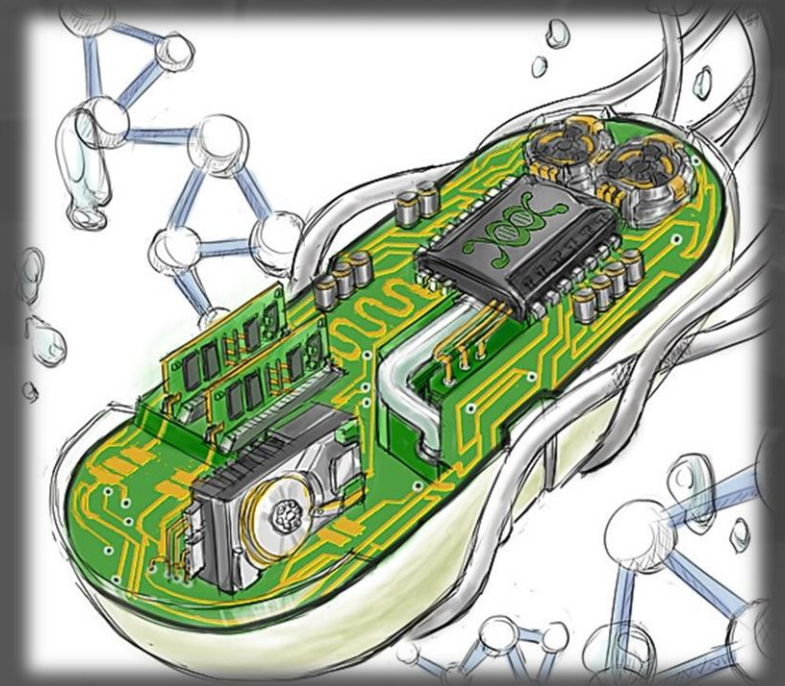
Possible history #3 synthetic biology

- ▶ Synthetic biology: engineering as solution to biology

“Knowledge as making might be said to be the first credo of synthetic biology. A closely related credo is the at least tacit denial of any meaningful distinction between science and engineering.” (Keller, 2009: 293)

- ▶ DIYbio: if biology is modular, everyone can do it

“You could perhaps have biological engineers who don’t know (and don’t necessarily need to know) that DNA is made up of four bases, if we could figure out how to organize the work and separate it into different layers.” (Endy, 2008: 344)



Possible history #3 iGEM



- ▶ The International Genetically Engineered Machine (iGEM)
 - ▶ Based on kit design your own biological system
- ▶ Starts in 2003 at MIT with 5 teams
 - ▶ 2016: 5,600 participants across 42 countries
- ▶ 2008: DIYbio.org network as result
 - ▶ +50 community labs, +4700 list members (February 2017)



Concluding questions

- ▶ What are the origins and goals of DIYbio?
- ▶ How many faces does DIYbio have and are they compatible?
- ▶ Is DIYbio the effect or cure of *science distrust*?
- ▶ What about its relations to the biotech industry?
- ▶ Is DIYbio a product of shifts within the life sciences?
- ▶ How to keep an eye on biosafety and biosecurity?

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Answers?

Real life observations

Winnie Poncelet

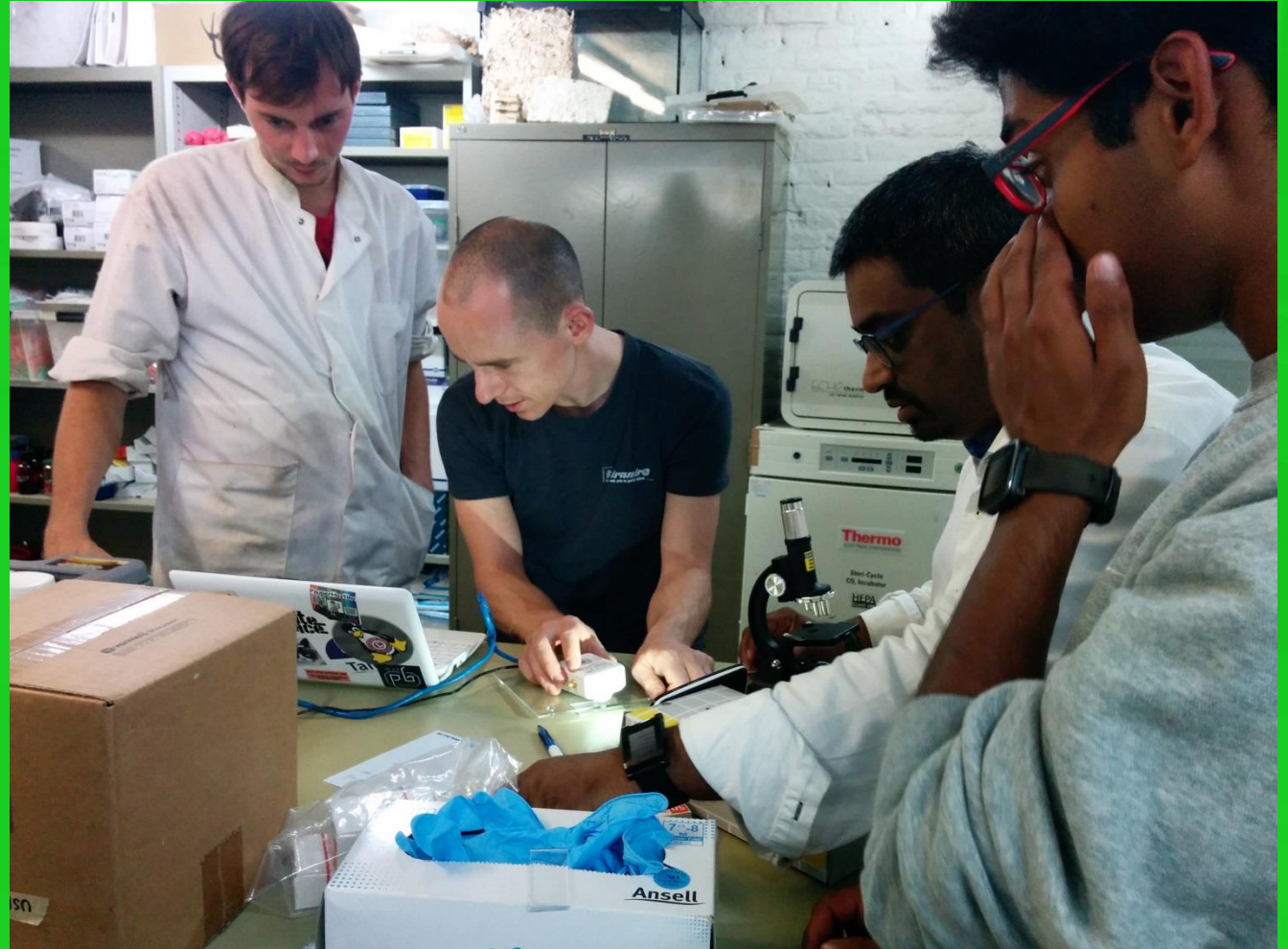
ReaGent



Origins

Two needs

► Bridging gap



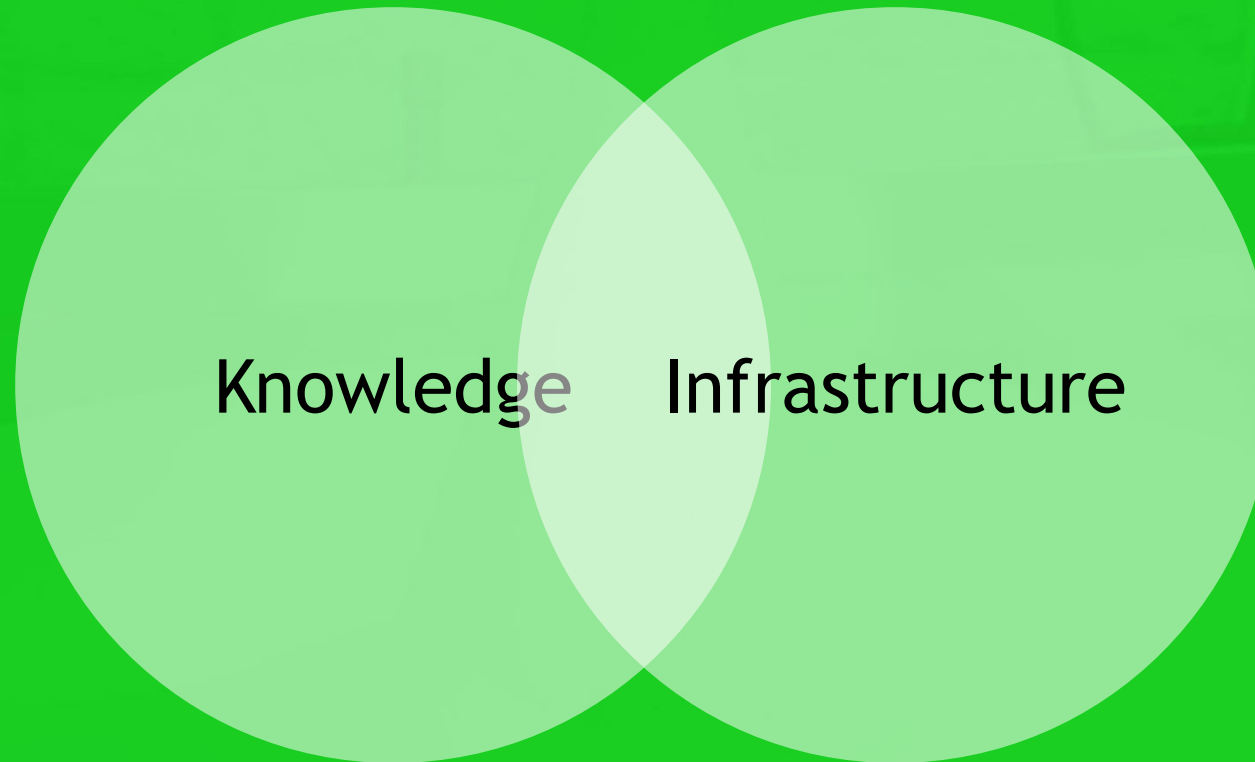
Origins

Two needs

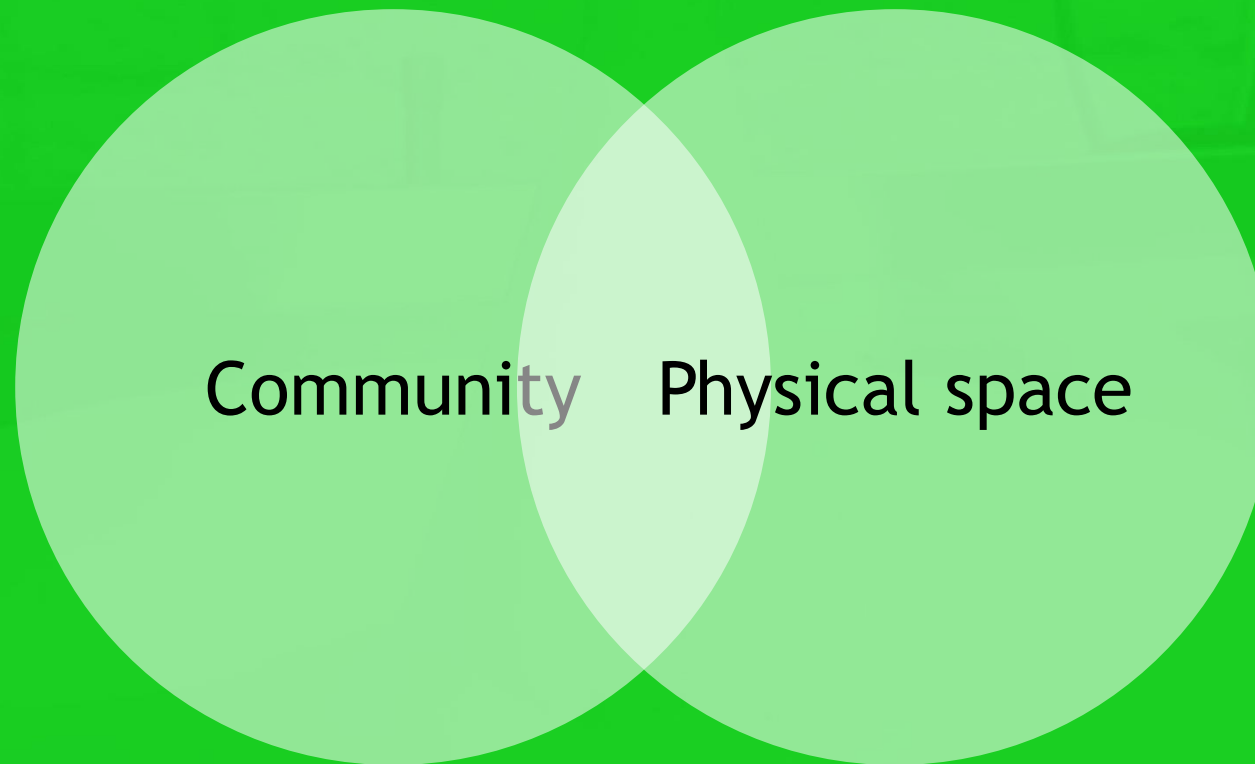
- Bridging gap
- Shared space



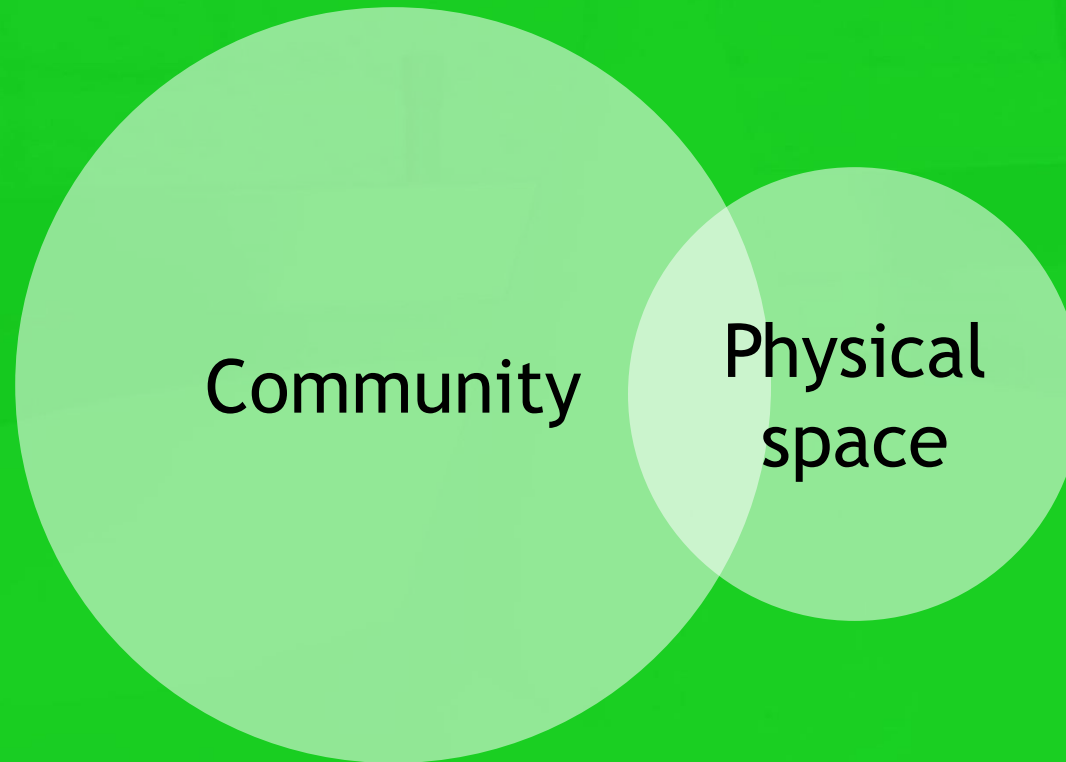
To make biosciences more accessible



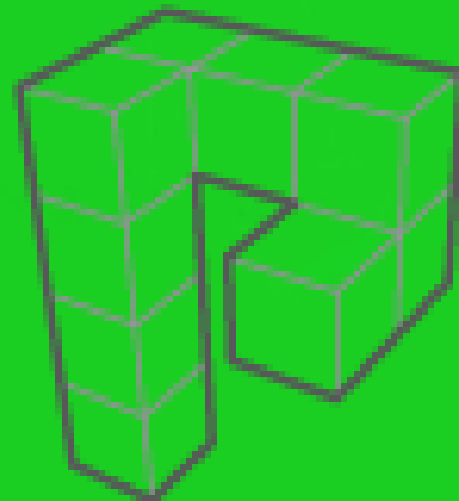
To start a lab



To start a lab



Diversification



LA
PAILLASSE

Diversification

Internal	External
Personal passions	Rent
(dis)agreements	Available machinery
Life events	Policy
...	...

Time is not money

Lab users

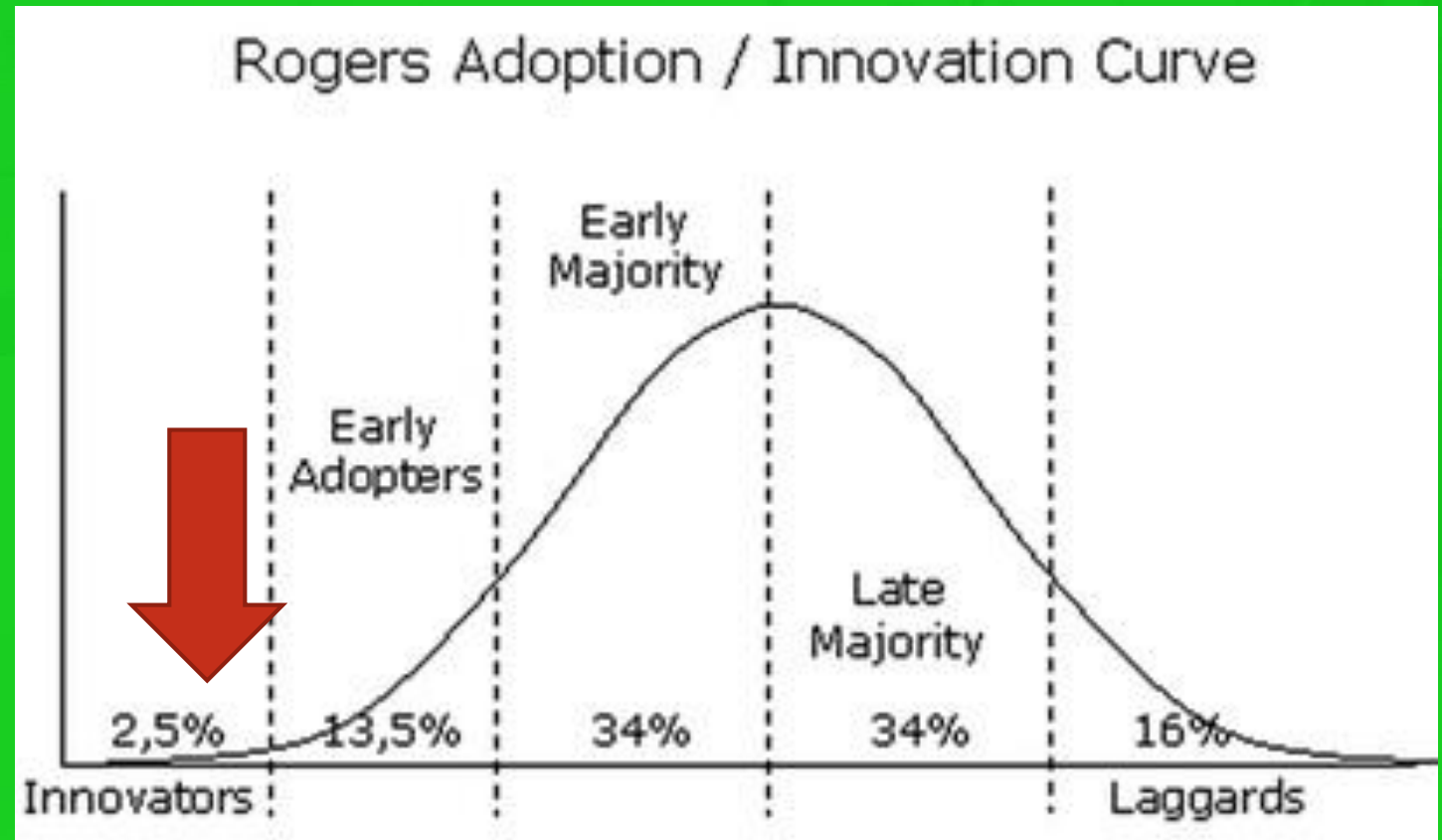
Volunteers

Hustlers

Present

► Young

► How to sustain?



Present

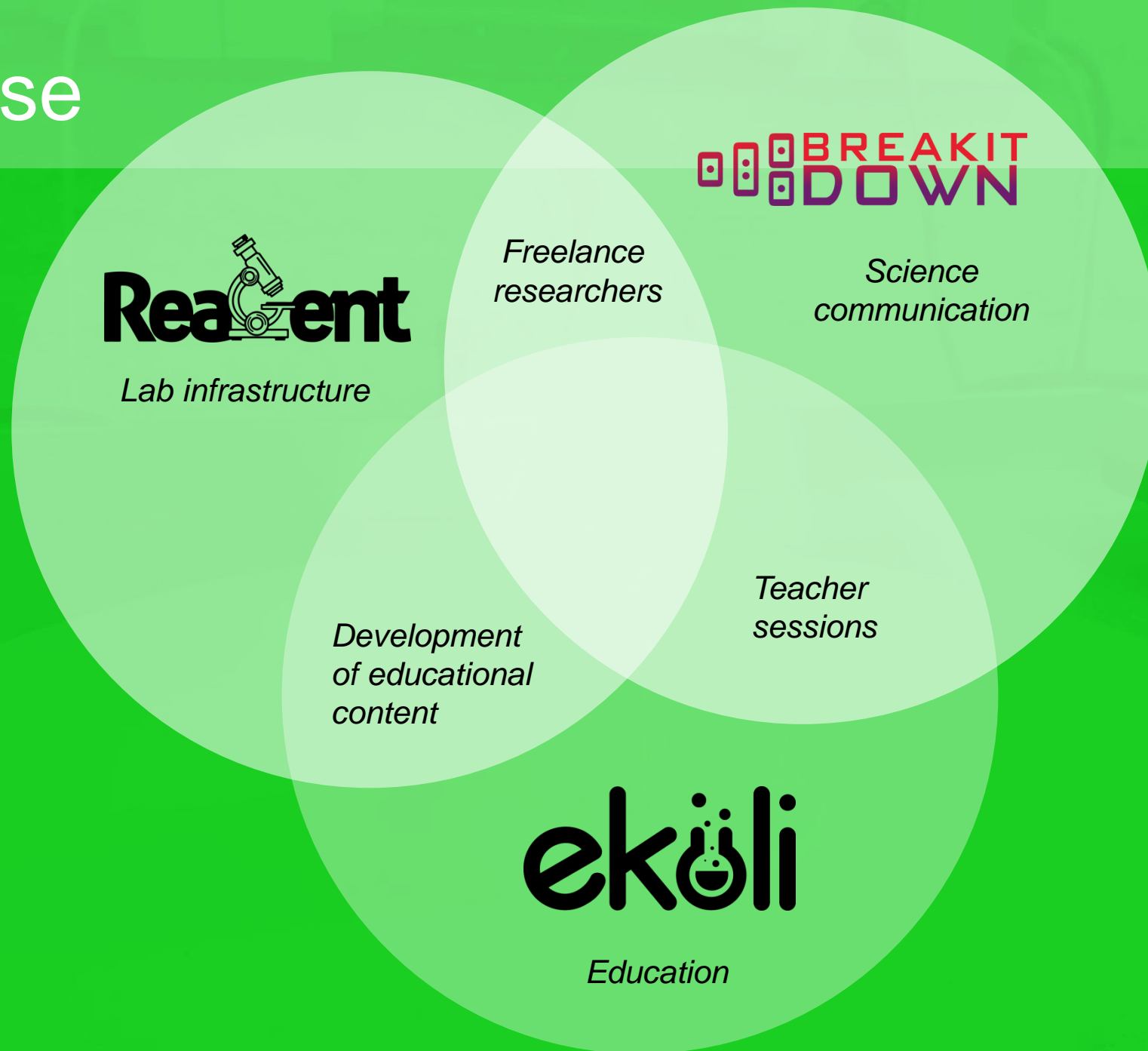
- ▶ Growth needed to sustain
- ▶ Limits to volunteer work
- ▶ Professionalization
- ▶ Drawn towards institutions -> compromise



Clear goals

- ▶ **Run biohacker space**
- ▶ **Affect institutional change**
- ▶ **Earn a living**

Our case



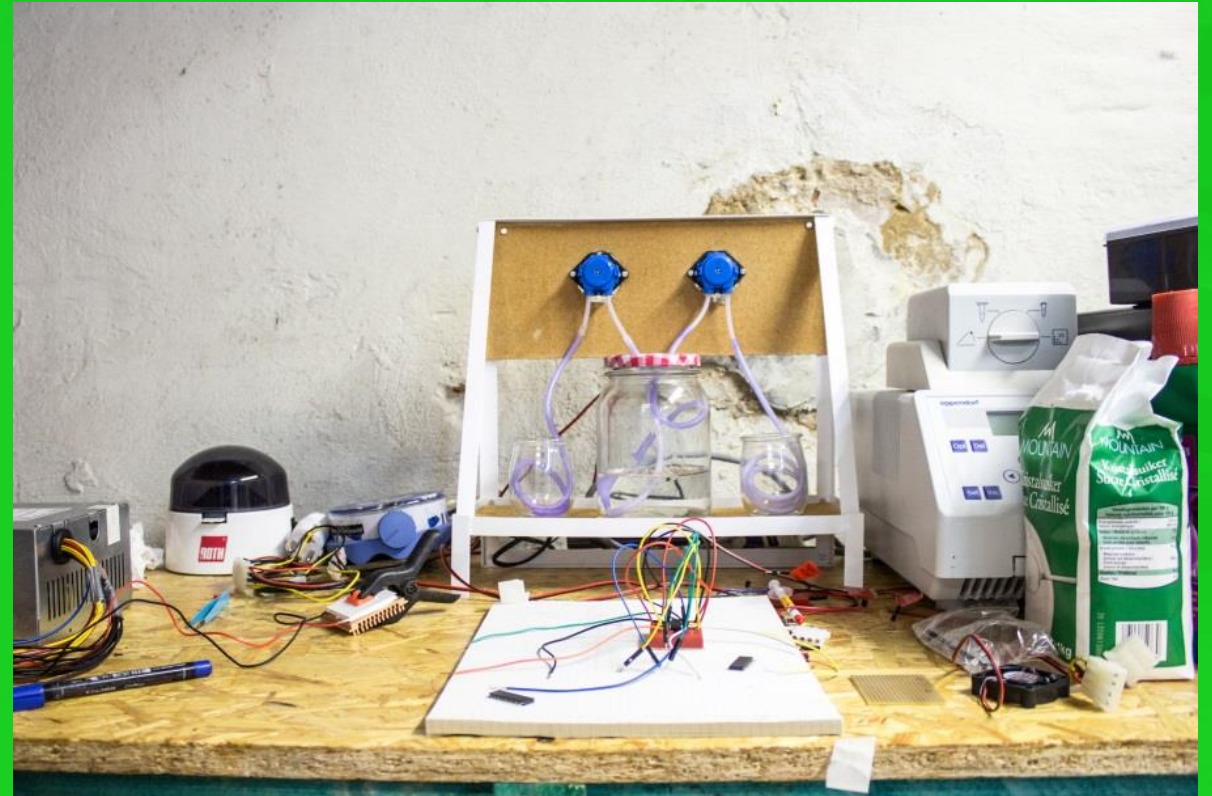
DIYbio BCN

- ▶ Just enough cooperation
- ▶ Pessimistic on institutional change



Sustaining

- ▶ DIYbio has precious skills
- ▶ Unique selling point
- ▶ Reality?



Keep non profit work non profit

Pay people if possible

Sell expertise, not a product

Find synergies, not scale

Have a broad curiosity

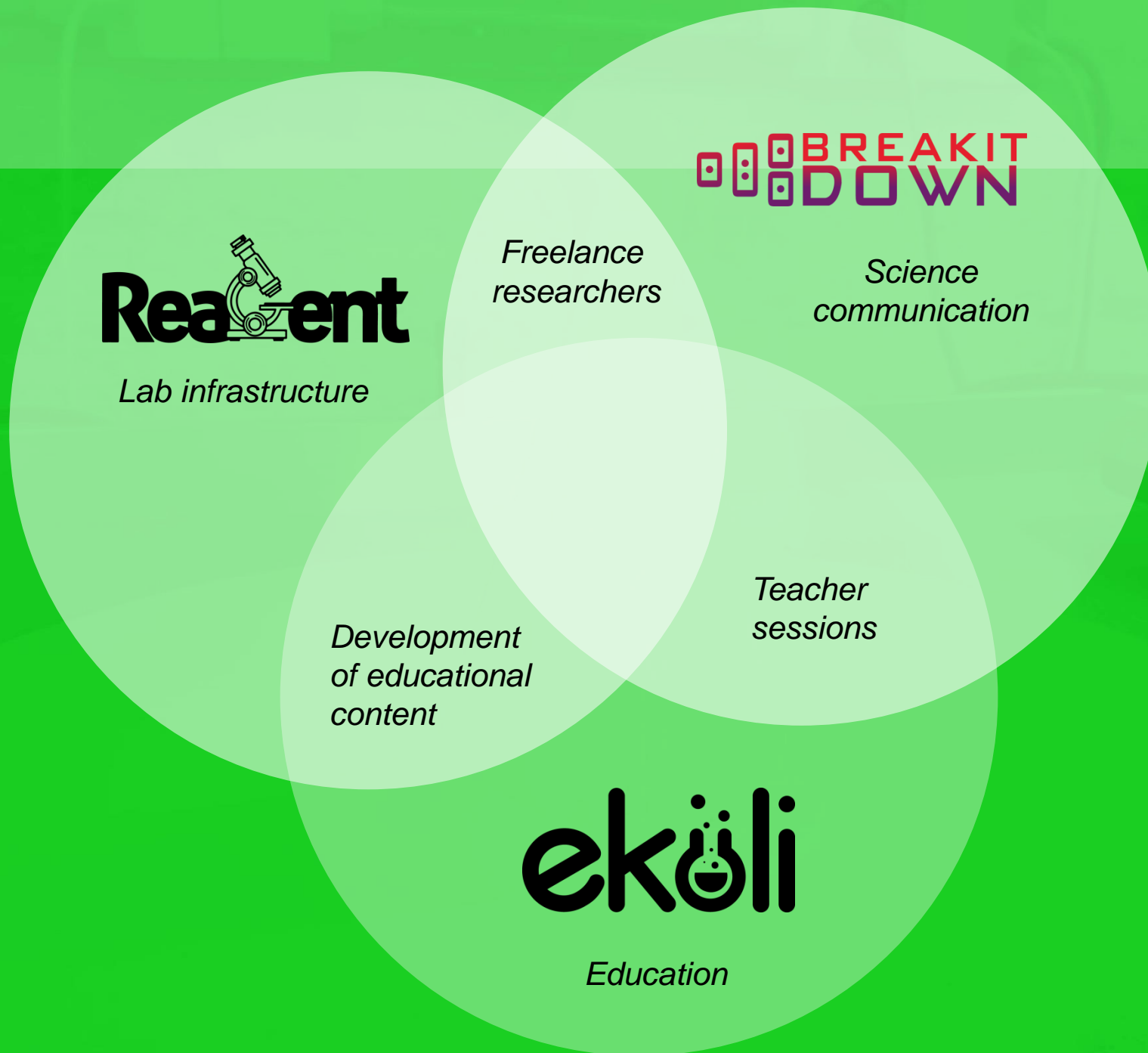
Stay independent



Future

- ▶ **Better education**
- ▶ **More accessible biosciences**
- ▶ **Interdisciplinary science**
- ▶ **Better science communication**

Future





Tonsils?